

REMARKS

Claims 1-8 are presented in the present application. Reconsideration and withdrawal of the present rejection in view of the amendments and the comments presented herein are respectfully requested.

Rejection under 35 U.S.C. §103(a)

Claims 1-5 were rejected under 35 U.S.C. §103(a) as being unpatentable over Ueda et al. (US 6,210,855) in view of Uetani et al. (US 5,424,167 and 5,290,657).

The Examiner alleges that it would have been *prima facie* obvious to use compounds (a)-(c) of Uetani et al. in the composition of Ueda et al. as the aromatic compound having 2 phenolic hydroxyl groups and reasonably expect the same or similar results as disclosed in Ueda et al. The Examiner also contends that it would have been *prima facie* obvious to use the additive compound in Uetani et al. ('567) as the low molecular (weight) aromatic compound having phenolic hydroxyl groups and reasonably expect the same or similar results as disclosed in Ueda et al. However, as discussed below, this combination of references does not render the present claims obvious.

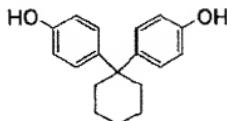
In the Office Action, the Examiner alleges that Ueda discloses a photosensitive novolak resin meeting the requirements of the component (A) recited in Claim 1 of the present application, and that the compound (C-21) described at column 11, lines 25-34 of Ueda is the same low molecular weight compound (e) as found at column 7, lines 49-56 of Uetani ('167). Further, the Examiner alleges that Uetani ('167) teaches functional equivalence of four phenolic compounds (represented by formulae (a) to (e)) at column 7, lines 49-56, wherein formulae (a) to (c) meet compound (b-11) as claimed, and concludes that a skilled person in the art would expect that any of those phenolic compounds listed in Uetani ('167) would function similarly in Ueda without changing the improved results of high resolution, heat resistance, dimensional control and film retention.

The compound (C-21) described at column 11, lines 25-34 of Ueda is bis(4-hydroxy-3,5-dimethylphenyl)-2-hydroxyphenylmethane, which is used in Comparative Examples 2 and 5 of the present application. As noted by the Examiner, Uetani ('167) teaches a phenolic compound (e) which is the same as the compound (C-21) taught in Ueda, and this phenolic compound (e) is described side by side with phenolic compounds (a) to (c) having functional equivalence and

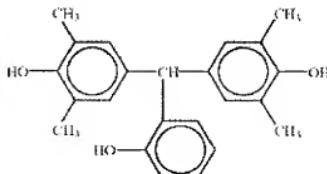
corresponding to the compound (b-11) as presently claimed. However, as demonstrated by the comparison between Example 3 and Comparative Example 5 of the present application, there is a significant difference in effects (such as perpendicularity of the pattern side walls, resolution and exposure margin) between the compound (b-11) recited in the present claims, and the compound (C-21) of Ueda or the phenolic compound (e) of Uetani ('167) (i.e., bis(4-hydroxy-3,5-dimethylphenyl)-2-hydroxyphenylmethane).

Specifically, in Example 3 of the present application, a compound (b-11) was used as a dissolution promoter in combination with the specific alkali-soluble novolak resin (A) recited in Claim 1 of the present application. In contrast, Comparative Example 5 of the present application was performed in substantially the same manner as in Example 3, except that bis(4-hydroxy-3,5-dimethylphenyl)-2-hydroxyphenylmethane was used as a dissolution promoter instead of the compound (b-11). For easier reference, the structural formulae of the dissolution promoters used in Example 3 and Comparative Example 5, respectively, are shown below.

Dissolution promoter used in Example 3 (compound (b-11) recited in present Claim 1):



Dissolution promoter used in Comparative Example 5 (the same compound as the compound (C-21) of Ueda and the phenolic compound (e) of Uetani ('167)):



The results show that the resist pattern obtained using the positive photoresist composition of Example 3 displayed excellent perpendicularity of the pattern side walls and excellent resolution, and the exposure margin was also high. In contrast, the resist pattern

obtained using the positive photoresist compositions of Comparative Example 5 displayed poorer level of perpendicularity and resolution than Example 3, and also had lower exposure margin (see specification at page 40, Table 1 and page 40, line13 to page 41, line 2. Thus, it is apparent that there is a significant difference in effects (such as perpendicularity of the pattern side walls, resolution and exposure margin) between the compound (b-11) and the compound (C-21) of Ueda or the phenolic compound (e) of Uetani ('167).

Ueda neither teaches nor suggests the compound (b-11) recited in present Claim 1. Uetani ('167) describes the phenolic compounds (a) to (c) (corresponding to the compound (b-11)) as having functional equivalence to the phenolic compound (e) (bis(4-hydroxy-3,5-dimethylphenyl)-2-hydroxyphenylmethane used in Comparative Example 5 of the present application). Further, Uetani ('167) neither teaches nor suggests the specific alkali-soluble novolak resin (A) recited in Claim 1 of the present application.

Thus, in view of the teaching of the equivalence of phenolic compounds (a)-(c) and (e) by Uetani et al, one of ordinary skill in the art would expect that compound (b-11) and compound (e) to produce the same or similar results. However, as discussed above, the results obtained using compound (b-11) were unexpectedly superior. Thus, even if there were a *prima facie* case of obviousness, the unexpected results obtained when the compound (b-11) is as a dissolution promoter, in combination with the specific alkali-soluble novolak resin (A), would effectively rebut any such showing because such unexpected results could not have been predicted based on the teachings of Ueda and Uetani ('167).

The Examiner further alleges that Uetani ('657) also discloses a phenolic dissolution inhibitor compound, and in view of the teachings of Ueda using a phenolic additive, the use of the phenolic compound in Uetani ('657) would be expected to function similarly in the composition of Ueda while maintaining the beneficial properties of high resolution, improved dimensional control, heat resistance and film thickness retention.

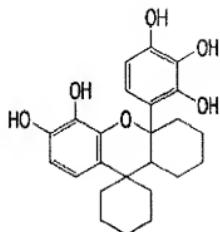
As described above, the compound (C-21) described at column 11, lines 25-34 of Ueda is bis(4-hydroxy-3,5-dimethylphenyl)-2-hydroxyphenylmethane, which is used in Comparative Examples 2 and 5 of the present application. Uetani ('657) discloses a phenolic compound corresponding to the compound (b-1) recited in Claim 1 of the present application.

The Examiner alleges that the use of the phenolic compound in Uetani ('657) (i.e., compound (b-1)) would be expected to function similarly in the composition of Ueda while

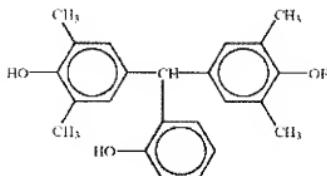
maintaining the beneficial properties of high resolution, improved dimensional control, heat resistance and film thickness retention. However, as demonstrated by Example 1 and Comparative Example 2 of the present application, there is a significant difference in effects (such as heat resistance, developing rate and perpendicularity) between the compound (b-1) and the compound (C-21) of Ueda (i.e., bis(4-hydroxy-3,5-dimethylphenyl)-2-hydroxyphenylmethane).

Specifically, in Example 1 of the present application, a compound (b-1) was used as a dissolution promoter in combination with the specific alkali-soluble novolak resin (A) recited in present Claim 1. In contrast, Comparative Example 2 of the present application was performed in substantially the same manner as was Example 1, except that bis(4-hydroxy-3,5-dimethylphenyl)-2-hydroxyphenylmethane was used as a dissolution promoter instead of the compound (b-1). For easier reference, the structural formulae of the dissolution promoters used in Example 1 and Comparative Example 2, respectively, are shown below.

Dissolution promoter used in Example 1 (compound (b-1) recited in Claim 1 of the present application):



Dissolution promoter used in Comparative Example 5 (the same compound as the compound (C-21) of Ueda):



It was found that the positive photoresist composition of Example 1 displayed excellent results for the cross sectional shape of the side walls of the formed resist pattern (the perpendicularity), the developing rate, the resolution, and the heat resistance. In contrast, the resist pattern obtained using the positive photoresist composition of Comparative Example 1 displayed poorer levels of heat resistance and developing rate than Example 1, and also suffered from inferior perpendicularity of the cross sectional shape (see page 38, Table 1, and page 38, lines 3 to 13 of the specification). Therefore, it is apparent that there is a significant difference in effects (such as heat resistance, developing rate and perpendicularity)) between the compound (b-1) as taught in Uetani ('657) and the compound (C-21) of Ueda.

Thus, even if there were a *prima facie* case obviousness, the unexpected, superior results obtained when the compound (b-1) is used as a dissolution promoter in combination with the specific alkali-soluble novolak resin (A), would effectively rebut any such showing because such unexpected results could not have been predicted based on the teachings of Ueda and Uetani ('657).

In view of the amendments and comments presented above, Applicants respectfully request reconsideration and withdrawal of the two rejections under 35 U.S.C. 103(a).

CONCLUSION

Applicants submit that all claims are in condition for allowance. However, if minor matters remain, the Examiner is invited to contact the undersigned at the telephone number provided below.

Respectfully submitted,

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